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ABSTRACT

A catalog of student-computer dialogues for physics teaching at the University of California at Irvine lists twenty different programs. Signing on and off are explained, then sixteen nongraphic and four graphic dialogues are listed with author, student level and information content described. (RB)

PHYSICS DIALOGS FOR STUDENT USE

Alfred M. Bork
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January 17, 1972

The Physics Department has physics teaching materials available for your use on the Sigma 7. Many of these programs can be run from ordinary terminals; a few demand special graphic terminals. My purpose here is to acquaint you with what is available and how to use it.

CALLING A DIALOG

After you have signed on the Sigma 7 you are at the executive or TEL level; the computer types an exclamation mark and waits for you to type something. To get a dialog you call it by its name followed by .PHYSICS; thus to get NEIL, after the computer has typed the exclamation mark, you type

NEIL.PHYSICS

followed by a carriage return. Note that you should not type any spaces. This identifies the program as NEIL in the account PHYSICS. Programs with other names are called in a similar way; all dialogs are stored in PHYSICS. See below for a list of available material.

Many dialogs begin by asking for an identification; this is for use in continuing a dialog at a later time. Enter anything you want.

LEAVING A DIALOG

You can leave a dialog by several procedures. One possibility is to type STOP at any input. Another is to press the break key; the computer will query you as to whether you want to continue with the program. If you do, type YES. Any other response, except OFF, including a carriage return, will cause you to leave the dialog, but stay on the computer. You can also type OFF after the machine asks you CONTINUE, and this will also sign you off directly.

TROUBLES

If you encounter any difficulty in running the dialogs, we would appreciate knowing about it. The dialogs are experimental, developed here at Irvine, and we can easily improve them if we know where the difficulties lie. Please report any problems to Alfred Bork (Physical Sciences 426) or Richard Ballard (Physical Sciences 430). If you have suggestions for improving a program, or ideas for a new dialog that you think would be useful in learning hysics, we should also like your suggestions.

NONGRAPHIC DIALOGS

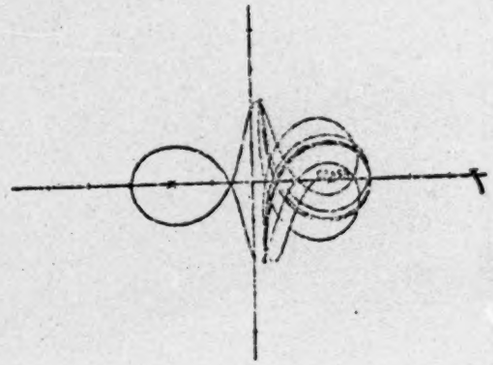
The following is a list of nongraphic dialogs currently available on the Sigma 7.

CONSERVE

Level: Physics 5A or 5B
Status: Tested with Physics 5A Students in 1969-70, rewritten, Tested in 1970-71.
Authors: Noah Sherman, University of Michigan, Alfred Bork
A guide to students to derive conservation of energy for a one dimensional mechanical system, assuming the laws of motion are known. Requires some knowledge of calculus.

NEIL

Level: High school beginning physics
Status: Used several years
Author: Steve Derenzo, University of California, Berkeley
A simulated moon landing, with you controlling the fuel.



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ED069003

COMPLEX

Level: High school or beginning college
Status: Used in Physics 5 1970-71
Authors: Alfred Bork and Lyn Calerdine
Checks knowledge of complex arithmetic and exponential functions of complex arguments. Offers assistance where that knowledge is weak. Diagnostic-remedial program.

TRANS

Level: Physics 5A
Status: Used with a few students from 1969-1971, rewritten
Author: Lyn Calderine
Coordinate transformations between two Cartesian systems--translations, reflections, Galilean transformation.

WORK

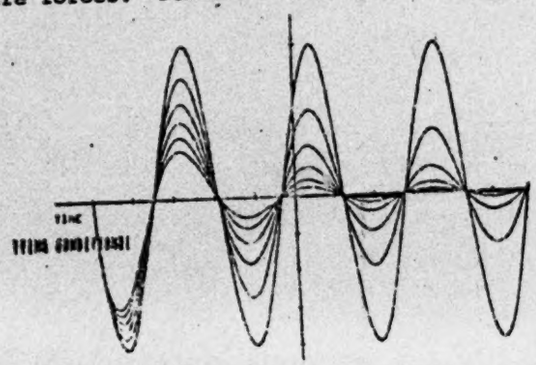
Level: Beginning Physics
Status: Untested
Authors: Ronald Blum, Commission on College Physics, Dennis Barrett
Introduction to the concept of work, through a series of examples.

ROTATE

Level: Beginning physics
Status: Used with a few Physics 5 students last year
Author: Lyn Calderine
Helps the student derive transformation equations for rotations.

PLANET

Level: Beginning or intermediate physics
Status: Used with a few Physics 5 students 1970-1971
Author: Mark Monroe
The Kepler problem for one body, by analytic methods. The differential equations of motion are solved for inverse square forces. Demands knowledge of calculus.



COUPOSC

Level: Physics 5B or intermediate
Status: Used 1970-71 in Physics 5A, rewritten
Author: Charles Munch
Introduction to coupled systems and characteristic frequencies. Two masses connected with three springs on an air track. You must first set up the Newtonian equations of motion, and then solve them. Assistance offered where needed. Approximate time: 2 hours.

CELLO

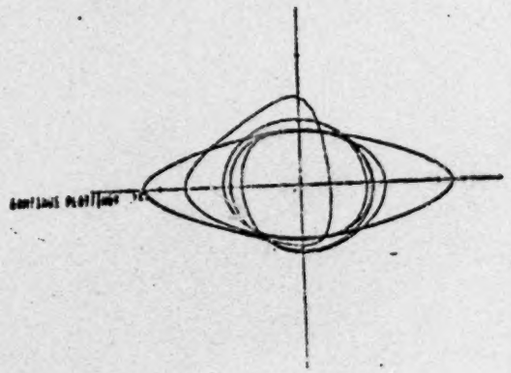
Level: Physics 5B or intermediate
Status: Used in 1970-71 in Physics 5B
Author: Alfred Bork
Standing waves on a string with fixed ends. Assumes knowledge of coupled systems, as given in COUPOSC. Also assumes elementary acquaintance with the one-dimensional classical wave equation.

MAGM

Level: Beginning or intermediate physics
Status: Untested
Authors: Alfred Bork, Greg Maxwell
Particle motion in an electromagnetic field. Analytic treatment.

COMPTON

Level: Physics 5B or intermediate
Status: Used in Physics 5B 1969-1971, rewritten
Author: Mark Monroe
Assistance for a student who has difficulty working problem 70 in Spacetime Physics, Taylor-Wheeler, concerning the relativistic Compton effect.



DOPPLER

Level: Physics 5B and intermediate physics
Status: Used in Physics 5B 1970-1971
Authors: Alfred Bork and Mark Monroe
Offers assistance to students having problems with problem 75 in Spacetime Physics, Taylor-Wheeler. The problem concerns the relativistic Doppler effect. Reviews Lorentz transformation for energy-momentum four vector.

ELECTRIC

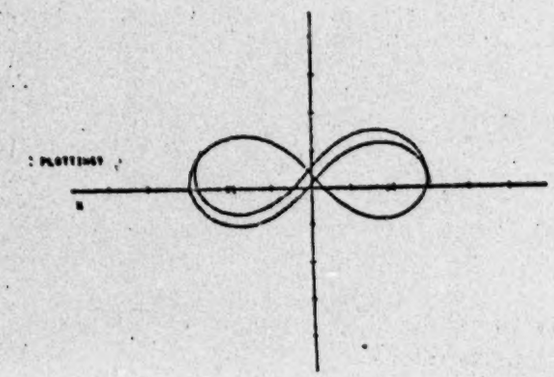
Level: Physics 3
Status: Used with a few students 1969-1971
Author: Kenneth Ford, University of Massachusetts, Boston
Ten simple questions checking knowledge of forces between charged particles and on charged particles in electric fields. Provides guidance to the student having problems. A "threshhold" quiz intended to insure a minimal standard of performance for all students in a class.

MAGQUIZ

Level: Physics 3
Status: Used with a few students 1970-1971
Author: Kenneth Ford, University of Massachusetts, Boston
Twenty questions which check a student's knowledge of magnetic fields; offers assistance when difficulties appear. A threshhold quiz intended to assure a minimum standard of performance for all students in a class.

BGAME

Level: Beginning physics
Status: Untested
Author: John Eastmond, Brigham Young University
Kinematics in the form of a basketball game.



TENNIS

Level: ?
Status: ?
Author: ?
Use at your own risk.

GRAPHIC DIALOGS

We have only a few graphic dialogs available. They must be run on special terminals. At the moment the graphic terminal most likely to work is in Room 449 in Physical Science. You are welcome to use this terminal.

Running a graphic dialog is like an ordinary dialog, with one exception. At the TEL level, after the exclamation mark, and before your program, you must type

PLATEN 0

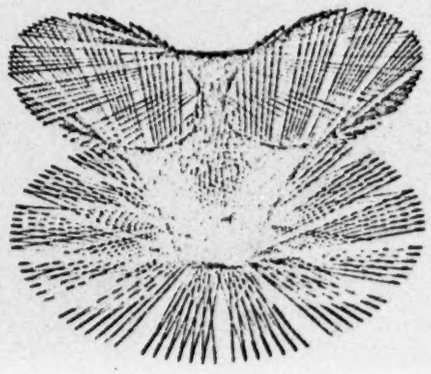
Followed by a carriage return. Otherwise you will, the first time you send graphic information to the terminal, be unhappy with the result! Here is a list of graphic material available:

GLEM

Level: Beginning physics
Status: Untested
Author: David Robson
A graphic version of a lunar landing, simulating instrumentation of a space craft.

GRAPH

Level: Any physics or math course
Status: Untested
Author: Hal Deering, John Collins, Alfred Bork
General curve plotting facility. Allows you to enter functions and plot them.



MOTION

Level: Beginning, intermediate, or graduate physics
Status: Tested with a few students in 1970-1971, revised
Authors: Richard Ballard, Alfred Bork
Allows you to study one-particle mechanical systems. The user specifies force law, initial conditions, and constants in the force equation. Plots a wide variety of physical variables in two or three dimensions.

GRID

Level: Beginning or intermediate physics
Status: Untested
Author: Kenneth Ford, University of Massachusetts, Boston, Mark Monroe
Study of diffraction under different situations.